HOCHSCHULE TRIER
Trier University of Applied Sciences
Informatik - Computer Science

Multi-core-Kommunikationsmechanismus zwischen AUTOSAR und Linux

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Betreuer: Prof. Dr. Jörn Schneider

Grundlegende Begriffe und Konzepte

- OS
- WCET
- RTOS
  - AUTOSAR
    - Tasks
    - ArcCore AB
      - Arctic Core
      - Arctic Studio
- CAN-Bus
- Dual core
- Linux .ko

econnect Germany

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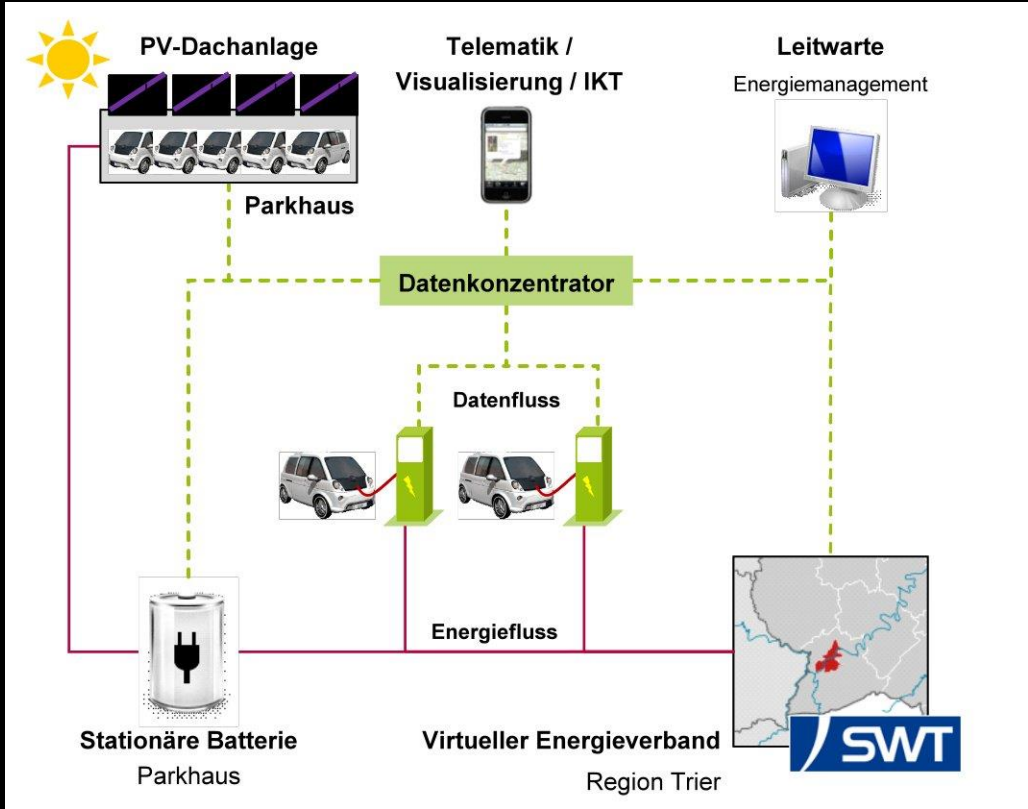
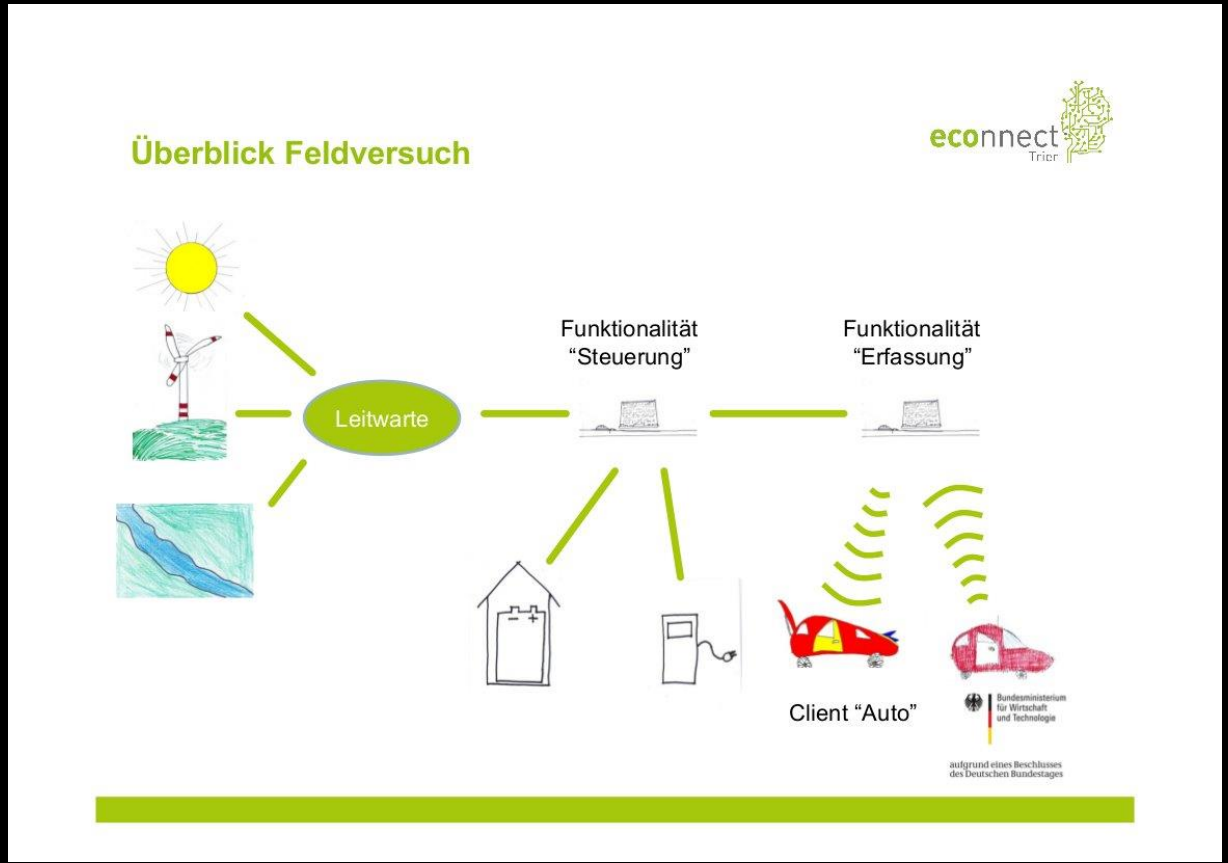
- 7 Stadtwerke
- F&E-Partner
- Smart
  - Traffic
  - Grid
- Hub TR
  - Stadtwerke
  - ABB AG
  - FVV
    - HS
    - Uni

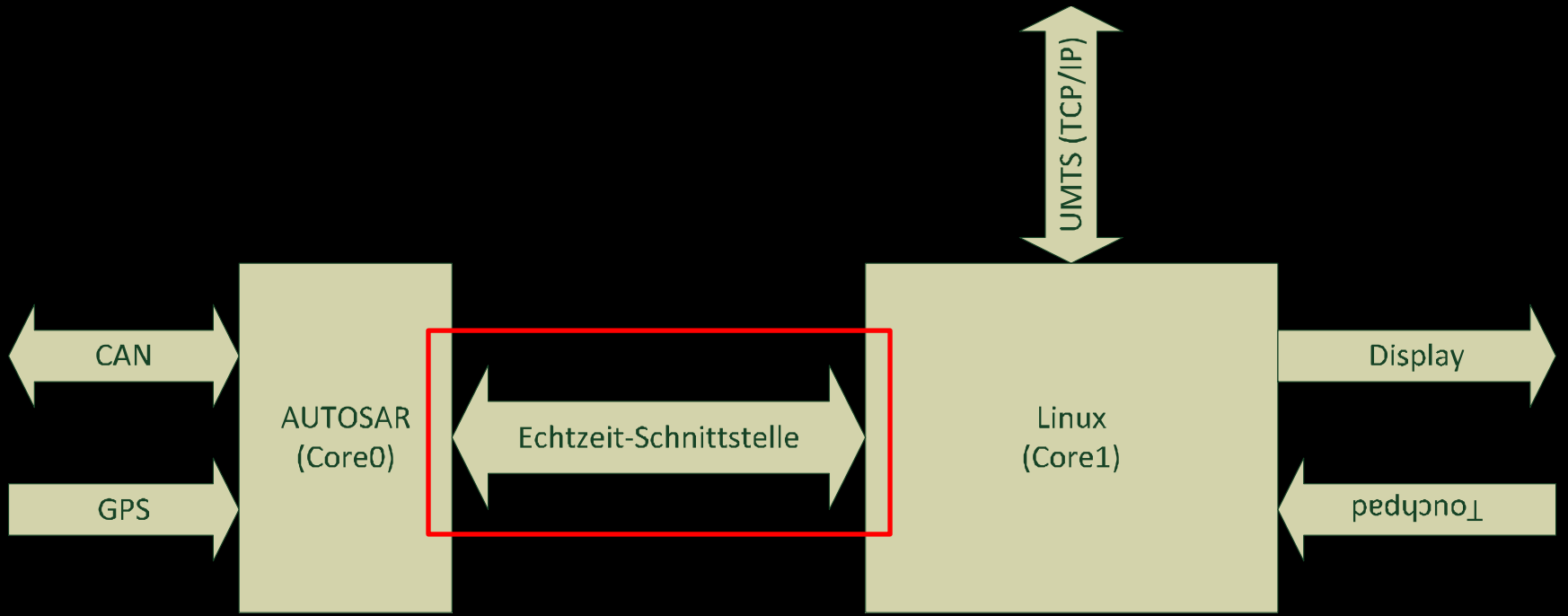
Gesamtkonzept Hub TR



Ermittlung der Nutzerakzeptanz



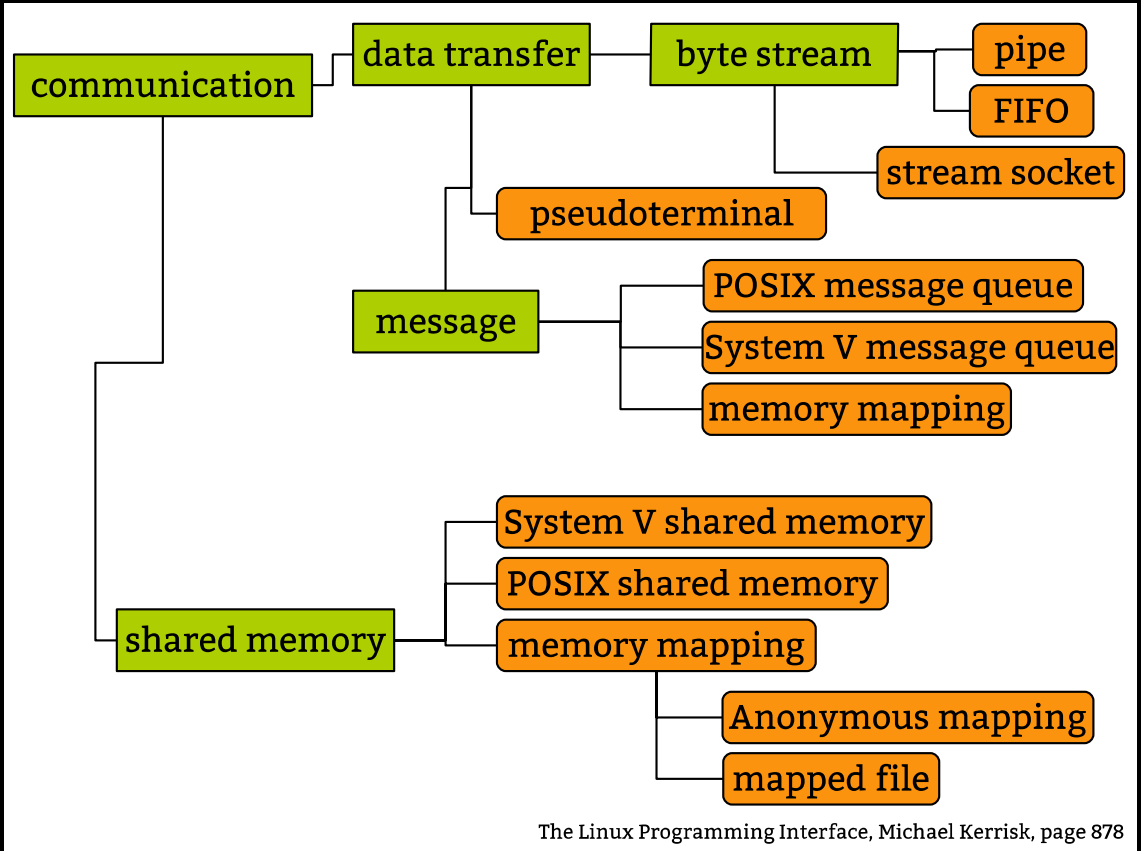
Architektur Fahrzeugrechnersystem



Problemstellung

- Ralf Kaiser: data logger
- MP
  - SMP
  - AMP
- RPMsg
- IPC

Linux IPC: communication

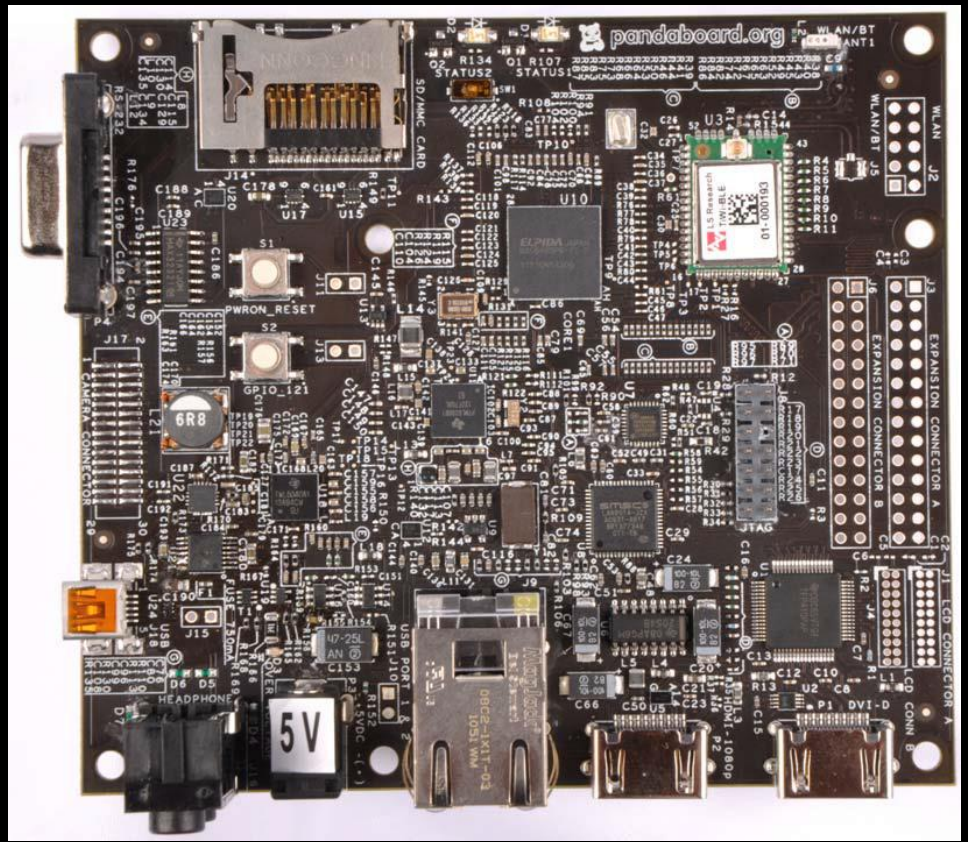


The Linux Programming Interface, Michael Kerrisk, page 878

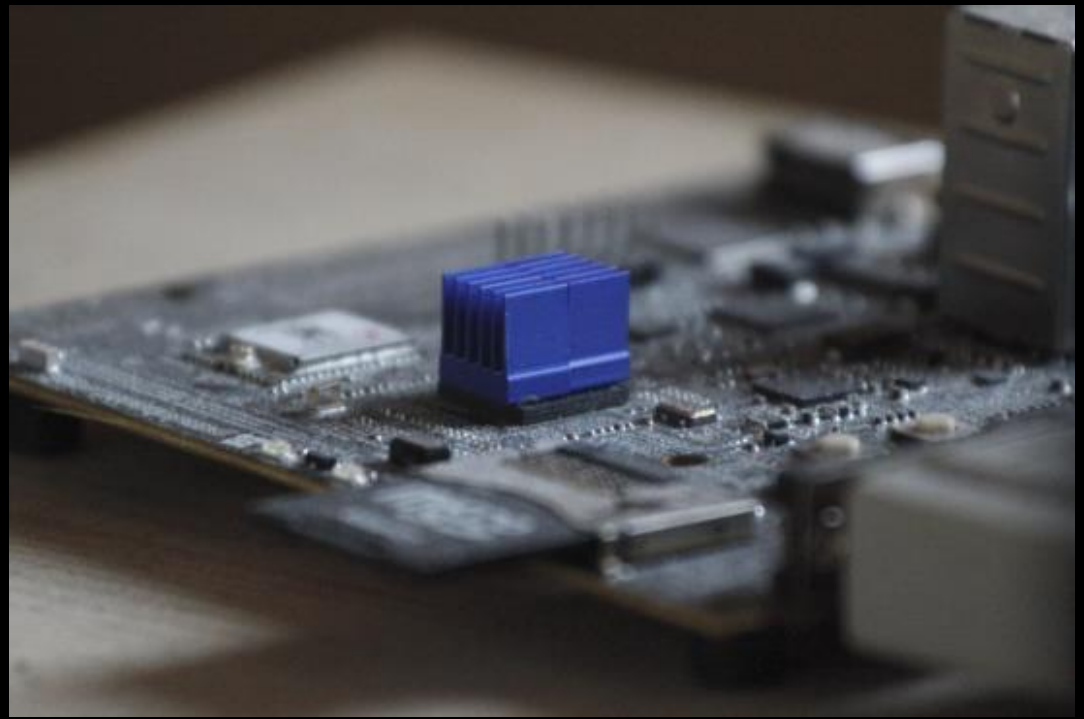
Aufgabenstellung und Zielsetzung

- producer/consumer
- Benachrichtigung
  - IPI
  - Polling

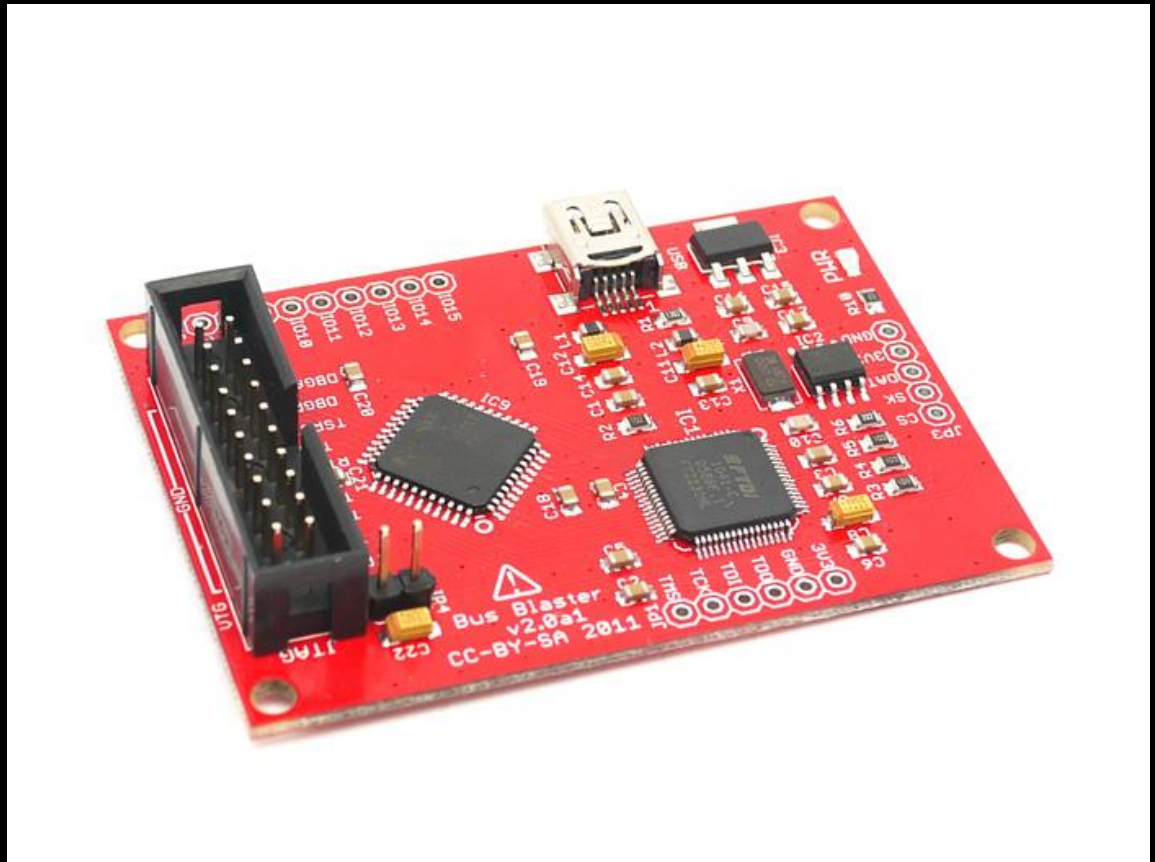
Pandaboard


pandaboard.org
PWRON_RESET
GPIO_121
5V
HEADPHONE
EXPANSION CONNECTOR A
EXPANSION CONNECTOR B
JTAG
DVI-D
SD/MMC CARD
WLAN
WLAN/BT

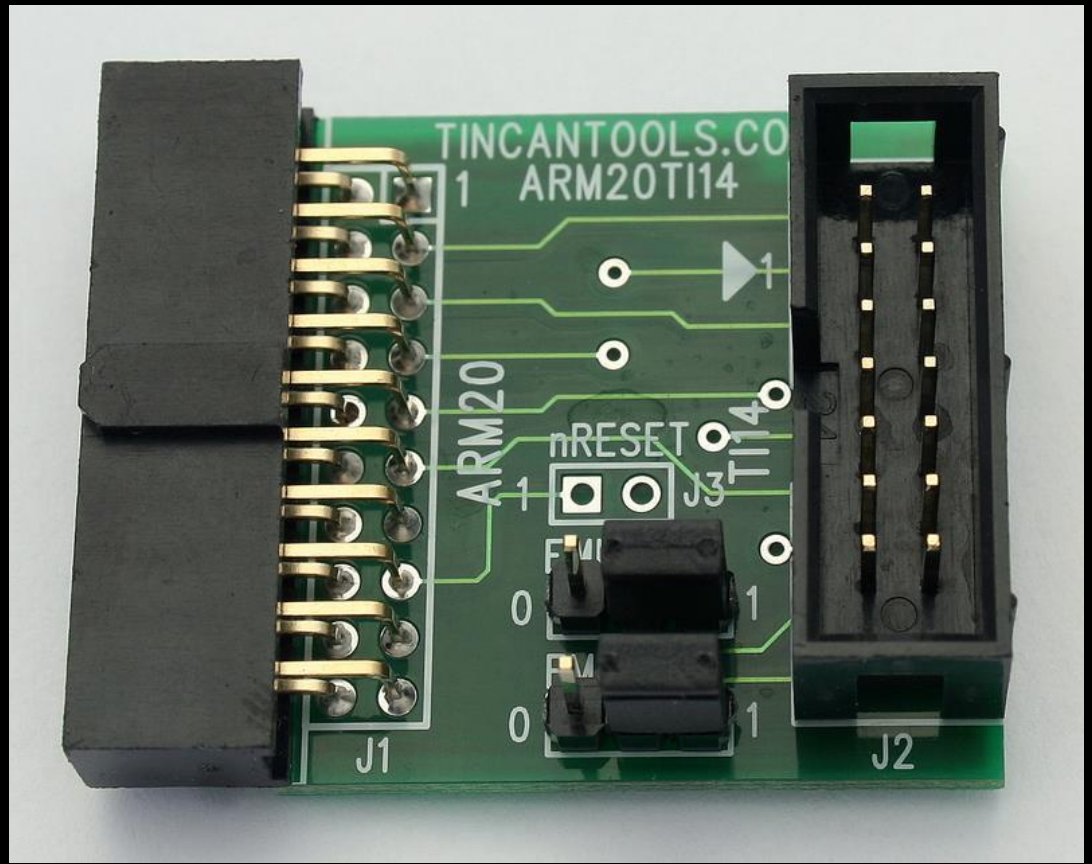
Kühlkörper



Bus Blaster



Adapter ARM20TI14



Kette Arctic Studio → Pandaboard

Arctic Studio/eclipse CDT (DSF)

gdb

OpenOCD

MiniUSB-Kabel

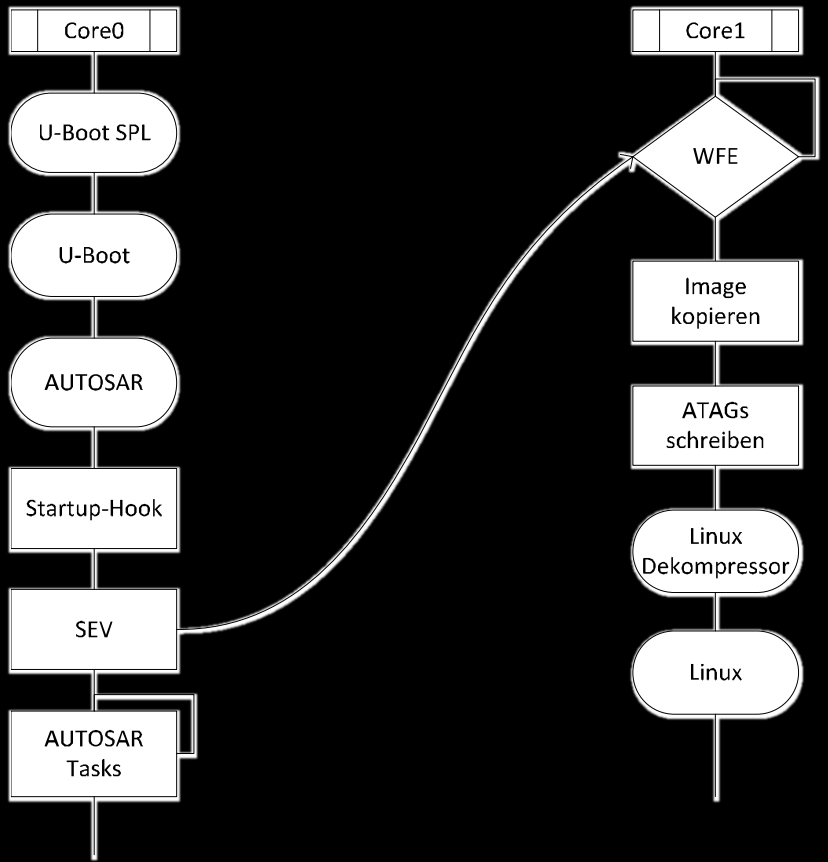
Bus Blaster

ARM20TI14-Adapter

14-poliges Flachbandkabel

Pandaboard

Angepaßte Bootkette



Algorithmus

- shared mem Ringpuffer; Adresse von AUTOSAR → Linux
  - Zählvariablen
  - Nachrichten fester Größe
- Producer prüft, ob bereits voll
- Consumer prüft, ob neue Nachricht vorhanden

Memory maps

`0xBFFFFFFF`	Ende des Puffers
`0xBFF00000`	Anfang des Puffers
`0x82500000`	Anfang des RAM-Abschnitts gemäß kernel command line `mem=986M@0x82500000`

...	
272	`message_1`
8	`message_0`
4	`consumeCount`
0	`produceCount`

263	`payload` Ende
8	`payload` Beginn
4	`command`
0	`seqence_number`

Ausblick

- memory barriers
- Gegenrichtung
- IPIs

Fazit

- Datenübertragung möglich
- lockfree
- waitfree

Erkenntnisse:

- dual core
- AUTOSAR
- JTAG
- kernel workqueue